



## SEQUENCE LISTING

<110> Dahlquist, Anders  
Stahl, Ulf  
Lenman, Marit  
Banas, Antoni  
Ronne, Hans

<120> A new class of enzymes in the biosynthetic pathway for the production of triacylglycerol and recombinant DNA molecules encoding these enzymes

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<140> US 09/537,710

<141> 2000-03-30

<150> EP 99106656.4

<151> 1999-04-01

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&lt;210&gt; 6

&lt;211&gt; 671

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 6

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Pro Ser Glu Glu Val Val His Asp Glu Asp Ser Gln Lys Lys Pro His
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```

Glu Ser Ser Lys Ser His His Lys Lys Ser Asn Gly Gly Gly Lys Trp
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```

```

Ser Cys Ile Asp Ser Cys Cys Trp Phe Ile Gly Cys Val Cys Val Thr
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```

```

Trp Trp Phe Leu Leu Phe Leu Tyr Asn Ala Met Pro Ala Ser Phe Pro
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```

Gln Tyr Val Thr Glu Arg Ile Thr Gly Pro Leu Pro Asp Pro Pro Gly

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Ile	Pro	Gly	Ile	Val	Thr	Gly	Gly	Leu	Glu	Leu	Trp	Glu	Gly	Lys	Gln				
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Cys	Ala	Asp	Gly	Leu	Phe	Arg	Lys	Arg	Leu	Trp	Gly	Gly	Thr	Phe	Gly				
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Glu	Val	Tyr	Lys	Arg	Pro	Leu	Cys	Trp	Val	Glu	His	Met	Ser	Leu	Asp				
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Asn	Glu	Thr	Gly	Leu	Asp	Pro	Ala	Gly	Ile	Arg	Val	Arg	Ala	Val	Ser				
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225					230					235					240				
Ser	Thr	Asn	Gly	Gly	Lys	Lys	Ala	Val	Ile	Val	Pro	His	Ser	Met	Gly				
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Val	Leu	Tyr	Phe	Leu	His	Phe	Met	Lys	Trp	Val	Glu	Ala	Pro	Ala	Pro				
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Val	Met	Asn	Ile	Gly	Gly	Pro	Phe	Leu	Gly	Val	Pro	Lys	Ala	Val	Ala				
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Gly	Leu	Phe	Ser	Ala	Glu	Ala	Lys	Asp	Val	Ala	Val	Ala	Arg	Ala	Ile				
305					310					315					320				
Ala	Pro	Gly	Phe	Leu	Asp	Thr	Asp	Ile	Phe	Arg	Leu	Gln	Thr	Leu	Gln				
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His	Val	Met	Arg	Met	Thr	Arg	Thr	Trp	Asp	Ser	Thr	Met	Ser	Met	Leu				
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Pro	Lys	Gly	Gly	Asp	Thr	Ile	Trp	Gly	Gly	Leu	Asp	Trp	Ser	Pro	Glu				
		355					360					365							
Lys	Gly	His	Thr	Cys	Cys	Gly	Lys	Lys	Gln	Lys	Asn	Asn	Glu	Thr	Cys				
	370					375					380								
Gly	Glu	Ala	Gly	Glu	Asn	Gly	Val	Ser	Lys	Lys	Ser	Pro	Val	Asn	Tyr				
385					390					395					400				

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<210> 7
<211> 643
<212> DNA
<213> Zea mays

<220>
<221> CDS
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<220>  
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<222> (1)..(402)

<221> Unsure

<222> 1..643

<223> n= a or g or c or t/u

<221> Unsure

<222> 1...643

<223> Xaa = unknown

<400> 7

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gat gaa act gtt cca gtt ctt agt gcg ggc tac atg tgt gcg aaa gga      96
Asp Glu Thr Val Pro Val Leu Ser Ala Gly Tyr Met Cys Ala Lys Gly
          20              25              30

tgg cgt ggc aaa act cgt ttc agc cct gcc ggc agc aag act tac gtg      144
Trp Arg Gly Lys Thr Arg Phe Ser Pro Ala Gly Ser Lys Thr Tyr Val
          35              40              45

aga gaa tac agc cat tcg cca ccc tct act ctc ctg gaa ggc agg ggc      192
Arg Glu Tyr Ser His Ser Pro Pro Ser Thr Leu Leu Glu Gly Arg Gly
          50              55              60

acc cag agc ggt gca cat gtt gat ata atg ggg aac ttt gct cta att      240
Thr Gln Ser Gly Ala His Val Asp Ile Met Gly Asn Phe Ala Leu Ile
          65              70              75              80

gag gac gtc atc aga ata gct gct ggg gca acc ggt gag gaa att ggt      288
Glu Asp Val Ile Arg Ile Ala Ala Gly Ala Thr Gly Glu Glu Ile Gly
          85              90              95

ggc gat cag gtt tat tca gat ata ttc aag tgg tca gag aaa atc aaa      336
Gly Asp Gln Val Tyr Ser Asp Ile Phe Lys Trp Ser Glu Lys Ile Lys
          100              105              110

ttg aaa ttg taa cct atg gga agt taa aga agt gcc gac ccg ttt att      384
Leu Lys Leu Xaa Pro Met Gly Ser Xaa Arg Ser Ala Asp Pro Phe Ile
          115              120              125

gcg ttc caa agt gtc ctg cctgagtgcg actctggatt ttgcttaaatt      432
Ala Phe Gln Ser Val Leu
          130

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tgcgatacga tggtgtaccg ctattttcag cattgtatat taaactgtac aggtgtaagt 552

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gcagtgcgcc aagcnaaaaa aaaaaaaaaa a      643

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<210> 8

<211> 115

<212> PRT

<213> Zea mays

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 20 25 30  
 Trp Arg Gly Lys Thr Arg Phe Ser Pro Ala Gly Ser Lys Thr Tyr Val  
 35 40 45  
 Arg Glu Tyr Ser His Ser Pro Pro Ser Thr Leu Leu Glu Gly Arg Gly  
 50 55 60  
 Thr Gln Ser Gly Ala His Val Asp Ile Met Gly Asn Phe Ala Leu Ile  
 65 70 75 80  
 Glu Asp Val Ile Arg Ile Ala Ala Gly Ala Thr Gly Glu Glu Ile Gly  
 85 90 95  
 Gly Asp Gln Val Tyr Ser Asp Ile Phe Lys Trp Ser Glu Lys Ile Lys  
 100 105 110  
 Leu Lys Leu  
 115

&lt;210&gt; 9

&lt;211&gt; 616

&lt;212&gt; DNA

<213> *Neurospora crassa*

&lt;220&gt;

&lt;221&gt; Unsure

&lt;222&gt; 1..616

&lt;223&gt; n= a or g or c or t/u

&lt;400&gt; 9

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 tttagatgac gatcgatacg actttgactn aggggcacat tgaccacggg gtgattttgg 240  
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 aaaaaaaaaa aaaaaa 616

&lt;210&gt; 10

&lt;211&gt; 1562

&lt;212&gt; DNA

<213> *Arabidopsis thaliana*

&lt;400&gt; 10

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&lt;210&gt; 11

&lt;211&gt; 3896

&lt;212&gt; DNA

<213> *Arabidopsis thaliana*

&lt;400&gt; 11

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<212> DNA
<213> Lycopersicon esculentum

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caacgatgca gatatgtatt cggggatggt cacctgggac agagttgcag attgaagagt 600

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 aacaagtttg cacaacatt tgaagaagaa agcgaaatga ttcagagag 709

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 <211> 623  
 <212> PRT  
 <213> Schizosaccharomyces pombe

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 Lys Ser Pro Ile Asp Leu Pro Asn Ser Lys Lys Pro Thr Arg Ala Leu  
 20 25 30  
 Ser Glu Gln Pro Ser Ala Ser Glu Thr Gln Ser Val Ser Asn Lys Ser  
 35 40 45  
 Arg Lys Ser Lys Phe Gly Lys Arg Leu Asn Phe Ile Leu Gly Ala Ile  
 50 55 60  
 Leu Gly Ile Cys Gly Ala Phe Phe Phe Ala Val Gly Asp Asp Asn Ala  
 65 70 75 80  
 Val Phe Asp Pro Ala Thr Leu Asp Lys Phe Gly Asn Met Leu Gly Ser  
 85 90 95  
 Ser Asp Leu Phe Asp Asp Ile Lys Gly Tyr Leu Ser Tyr Asn Val Phe  
 100 105 110  
 Lys Asp Ala Pro Phe Thr Thr Asp Lys Pro Ser Gln Ser Pro Ser Gly  
 115 120 125  
 Asn Glu Val Gln Val Gly Leu Asp Met Tyr Asn Glu Gly Tyr Arg Ser  
 130 135 140  
 Asp His Pro Val Ile Met Val Pro Gly Val Ile Ser Ser Gly Leu Glu  
 145 150 155 160  
 Ser Trp Ser Phe Asn Asn Cys Ser Ile Pro Tyr Phe Arg Lys Arg Leu  
 165 170 175  
 Trp Gly Ser Trp Ser Met Leu Lys Ala Met Phe Leu Asp Lys Gln Cys  
 180 185 190  
 Trp Leu Glu His Leu Met Leu Asp Lys Lys Thr Gly Leu Asp Pro Lys  
 195 200 205  
 Gly Ile Lys Leu Arg Ala Ala Gln Gly Phe Glu Ala Ala Asp Phe Phe  
 210 215 220  
 Ile Thr Gly Tyr Trp Ile Trp Ser Lys Val Ile Glu Asn Leu Ala Ala  
 225 230 235 240  
 Ile Gly Tyr Glu Pro Asn Asn Met Leu Ser Ala Ser Tyr Asp Trp Arg  
 245 250 255  
 Leu Ser Tyr Ala Asn Leu Glu Glu Arg Asp Lys Tyr Phe Ser Lys Leu



260					265					270					
Lys	Met	Phe	Ile	Glu	Tyr	Ser	Asn	Ile	Val	His	Lys	Lys	Lys	Val	Val
		275					280					285			
Leu	Ile	Ser	His	Ser	Met	Gly	Ser	Gln	Val	Thr	Tyr	Tyr	Phe	Phe	Lys
	290					295					300				
Trp	Val	Glu	Ala	Glu	Gly	Tyr	Gly	Asn	Gly	Gly	Pro	Thr	Trp	Val	Asn
305					310					315					320
Asp	His	Ile	Glu	Ala	Phe	Ile	Asn	Ile	Ser	Gly	Ser	Leu	Ile	Gly	Ala
				325					330					335	
Pro	Lys	Thr	Val	Ala	Ala	Leu	Leu	Ser	Gly	Glu	Met	Lys	Asp	Thr	Gly
			340					345					350		
Ile	Val	Ile	Thr	Leu	Asn	Ile	Leu	Glu	Lys	Phe	Phe	Ser	Arg	Ser	Glu
		355					360						365		
Arg	Ala	Met	Met	Val	Arg	Thr	Met	Gly	Gly	Val	Ser	Ser	Met	Leu	Pro
	370					375					380				
Lys	Gly	Gly	Asp	Val	Ala	Pro	Asp	Asp	Leu	Asn	Gln	Thr	Asn	Phe	Ser
385					390					395					400
Asn	Gly	Ala	Ile	Ile	Arg	Tyr	Arg	Glu	Asp	Ile	Asp	Lys	Asp	His	Asp
				405					410					415	
Glu	Phe	Asp	Ile	Asp	Asp	Ala	Leu	Gln	Phe	Leu	Lys	Asn	Val	Thr	Asp
			420					425					430		
Asp	Asp	Phe	Lys	Val	Met	Leu	Ala	Lys	Asn	Tyr	Ser	His	Gly	Leu	Ala
		435					440					445			
Trp	Thr	Glu	Lys	Glu	Val	Leu	Lys	Asn	Asn	Glu	Met	Pro	Ser	Lys	Trp
	450					455					460				
Ile	Asn	Pro	Leu	Glu	Thr	Ser	Leu	Pro	Tyr	Ala	Pro	Asp	Met	Lys	Ile
465					470					475					480
Tyr	Cys	Val	His	Gly	Val	Gly	Lys	Pro	Thr	Glu	Arg	Gly	Tyr	Tyr	Tyr
				485					490					495	
Thr	Asn	Asn	Pro	Glu	Gly	Gln	Pro	Val	Ile	Asp	Ser	Ser	Val	Asn	Asp
			500					505					510		
Gly	Thr	Lys	Val	Glu	Asn	Gly	Ile	Val	Met	Asp	Asp	Gly	Asp	Gly	Thr
		515					520					525			
Leu	Pro	Ile	Leu	Ala	Leu	Gly	Leu	Val	Cys	Asn	Lys	Val	Trp	Gln	Thr
	530					535					540				
Lys	Arg	Phe	Asn	Pro	Ala	Asn	Thr	Ser	Ile	Thr	Asn	Tyr	Glu	Ile	Lys
545					550					555					560
His	Glu	Pro	Ala	Ala	Phe	Asp	Leu	Arg	Gly	Gly	Pro	Arg	Ser	Ala	Glu
				565					570					575	

His Val Asp Ile Leu Gly His Ser Glu Leu Asn Glu Ile Ile Leu Lys  
580 585 590

Val Ser Ser Gly His Gly Asp Ser Val Pro Asn Arg Tyr Ile Ser Asp  
595 600 605

Ile Gln Glu Ile Ile Asn Glu Ile Asn Leu Asp Lys Pro Arg Asn  
610 615 620

<210> 14

<211> 432

<212> PRT

<213> Arabidopsis thaliana

<400> 14

Met Lys Lys Ile Ser Ser His Tyr Ser Val Val Ile Ala Ile Leu Val  
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Val Val Thr Met Thr Ser Met Cys Gln Ala Val Gly Ser Asn Val Tyr  
20 25 30

Pro Leu Ile Leu Val Pro Gly Asn Gly Gly Asn Gln Leu Glu Val Arg  
35 40 45

Leu Asp Arg Glu Tyr Lys Pro Ser Ser Val Trp Cys Ser Ser Trp Leu  
50 55 60

Tyr Pro Ile His Lys Lys Ser Gly Gly Trp Phe Arg Leu Trp Phe Asp  
65 70 75 80

Ala Ala Val Leu Leu Ser Pro Phe Thr Arg Cys Phe Ser Asp Arg Met  
85 90 95

Met Leu Tyr Tyr Asp Pro Asp Leu Asp Asp Tyr Gln Asn Ala Pro Gly  
100 105 110

Val Gln Thr Arg Val Pro His Phe Gly Ser Thr Lys Ser Leu Leu Tyr  
115 120 125

Leu Asp Pro Arg Leu Arg Asp Ala Thr Ser Tyr Met Glu His Leu Val  
130 135 140

Lys Ala Leu Glu Lys Lys Cys Gly Tyr Val Asn Asp Gln Thr Ile Leu  
145 150 155 160

Gly Ala Pro Tyr Asp Phe Arg Tyr Gly Leu Ala Ala Ser Gly His Pro  
165 170 175

Ser Arg Val Ala Ser Gln Phe Leu Gln Asp Leu Lys Gln Leu Val Glu  
180 185 190

Lys Thr Ser Ser Glu Asn Glu Gly Lys Pro Val Ile Leu Leu Ser His  
195 200 205

Ser Leu Gly Gly Leu Phe Val Leu His Phe Leu Asn Arg Thr Thr Pro  
210 215 220

Ser Trp Arg Arg Lys Tyr Ile Lys His Phe Val Ala Leu Ala Ala Pro

225		230		235		240
Trp Gly Gly Thr	Ile Ser Gln Met Lys Thr Phe Ala Ser Gly Asn Thr					
	245		250		255	
Leu Gly Val Pro	Leu Val Asn Pro Leu Leu Val Arg Arg His Gln Arg					
	260	265		270		
Thr Ser Glu Ser	Asn Gln Trp Leu Leu Pro Ser Thr Lys Val Phe His					
	275	280	285			
Asp Arg Thr Lys	Pro Leu Val Val Thr Pro Gln Val Asn Tyr Thr Ala					
	290	295	300			
Tyr Glu Met Asp	Arg Phe Phe Ala Asp Ile Gly Phe Ser Gln Gly Val					
305	310	315			320	
Val Pro Tyr Lys	Thr Arg Val Leu Pro Leu Thr Glu Glu Leu Met Thr					
	325	330		335		
Pro Gly Val Pro	Val Thr Cys Ile Tyr Gly Arg Gly Val Asp Thr Pro					
	340	345	350			
Glu Val Leu Met	Tyr Gly Lys Gly Gly Phe Asp Lys Gln Pro Glu Ile					
	355	360	365			
Lys Tyr Gly Asp	Gly Asp Gly Thr Val Asn Leu Ala Ser Leu Ala Ala					
	370	375	380			
Leu Lys Val Asp	Ser Leu Asn Thr Val Glu Ile Asp Gly Val Ser His					
385	390	395	400			
Thr Ser Ile Leu	Lys Asp Glu Ile Ala Leu Lys Glu Ile Met Lys Gln					
	405	410	415			
Ile Ser Ile Ile	Asn Tyr Glu Leu Ala Asn Val Asn Ala Val Asn Glu					
	420	425	430			

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 <212> PRT  
 <213> Arabidopsis thaliana

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 Met Gly Ala Asn Ser Lys Ser Val Thr Ala Ser Phe Thr Val Ile Ala  
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 20 25 30  
 Glu Phe His Gly Asp Tyr Ser Lys Leu Ser Gly Ile Ile Ile Pro Gly  
 35 40 45  
 Phe Ala Ser Thr Gln Leu Arg Ala Trp Ser Ile Leu Asp Cys Pro Tyr  
 50 55 60

Thr	Pro	Leu	Asp	Phe	Asn	Pro	Leu	Asp	Leu	Val	Trp	Leu	Asp	Thr	Thr	65	70	75	80
Lys	Leu	Leu	Ser	Ala	Val	Asn	Cys	Trp	Phe	Lys	Cys	Met	Val	Leu	Asp	85	90	95	
Pro	Tyr	Asn	Gln	Thr	Asp	His	Pro	Glu	Cys	Lys	Ser	Arg	Pro	Asp	Ser	100	105	110	
Gly	Leu	Ser	Ala	Ile	Thr	Glu	Leu	Asp	Pro	Gly	Tyr	Ile	Thr	Gly	Pro	115	120	125	
Leu	Ser	Thr	Val	Trp	Lys	Glu	Trp	Leu	Lys	Trp	Cys	Val	Glu	Phe	Gly	130	135	140	
Ile	Glu	Ala	Asn	Ala	Ile	Val	Ala	Val	Pro	Tyr	Asp	Trp	Arg	Leu	Ser	145	150	155	160
Pro	Thr	Lys	Leu	Glu	Glu	Arg	Asp	Leu	Tyr	Phe	His	Lys	Leu	Lys	Leu	165	170	175	
Thr	Phe	Glu	Thr	Ala	Leu	Lys	Leu	Arg	Gly	Gly	Pro	Ser	Ile	Val	Phe	180	185	190	
Ala	His	Ser	Met	Gly	Asn	Asn	Val	Phe	Arg	Tyr	Phe	Leu	Glu	Trp	Leu	195	200	205	
Arg	Leu	Glu	Ile	Ala	Pro	Lys	His	Tyr	Leu	Lys	Trp	Leu	Asp	Gln	His	210	215	220	
Ile	His	Ala	Tyr	Phe	Ala	Val	Gly	Ala	Pro	Leu	Leu	Gly	Ser	Val	Glu	225	230	235	240
Ala	Ile	Lys	Ser	Thr	Leu	Ser	Gly	Val	Thr	Phe	Gly	Leu	Pro	Val	Ser	245	250	255	
Glu	Gly	Thr	Ala	Arg	Leu	Leu	Ser	Asn	Ser	Phe	Ala	Ser	Ser	Leu	Trp	260	265	270	
Leu	Met	Pro	Phe	Ser	Lys	Asn	Cys	Lys	Gly	Asp	Asn	Thr	Phe	Trp	Thr	275	280	285	
His	Phe	Ser	Gly	Gly	Ala	Ala	Lys	Lys	Asp	Lys	Arg	Val	Tyr	His	Cys	290	295	300	
Asp	Glu	Glu	Glu	Tyr	Gln	Ser	Lys	Tyr	Ser	Gly	Trp	Pro	Thr	Asn	Ile	305	310	315	320
Ile	Asn	Ile	Glu	Ile	Pro	Ser	Thr	Ser	Ala	Arg	Glu	Leu	Ala	Asp	Gly	325	330	335	
Thr	Leu	Phe	Lys	Ala	Ile	Glu	Asp	Tyr	Asp	Pro	Asp	Ser	Lys	Arg	Met	340	345	350	
Leu	His	Gln	Leu	Lys	Lys	Tyr	Val	Pro	Phe	Phe	Val	Ile	Arg	Asn	Ile	355	360	365	
Ala	His	Arg	Ser	Ser	Leu	Ala	Gly	Phe	Leu	Leu	Tyr	His	Asp	Asp	Pro	370	375	380	

Val Phe Asn Pro Leu Thr Pro Trp Glu Arg Pro Pro Ile Lys Asn Val  
 385 390 395 400  
 Phe Cys Ile Tyr Gly Ala His Leu Lys Thr Glu Val Gly Tyr Tyr Phe  
 405 410 415  
 Ala Pro Ser Gly Lys Pro Tyr Pro Asp Asn Trp Ile Ile Thr Asp Ile  
 420 425 430  
 Ile Tyr Glu Thr Glu Gly Ser Leu Val Ser Arg Ser Gly Thr Val Val  
 435 440 445  
 Asp Gly Asn Ala Gly Pro Ile Thr Gly Asp Glu Thr Val Pro Tyr His  
 450 455 460  
 Ser Leu Ser Trp Cys Lys Asn Trp Leu Gly Pro Lys Val Asn Ile Thr  
 465 470 475 480  
 Met Ala Pro Gln Ile Leu Ile Gly Lys Ile Lys Gln Gln Pro Glu His  
 485 490 495  
 Asp Gly Ser Asp Val His Val Glu Leu Asn Val Asp His Glu His Gly  
 500 505 510  
 Ser Asp Ile Ile Ala Asn Met Thr Lys Ala Pro Arg Val Lys Tyr Ile  
 515 520 525  
 Thr Phe Tyr Glu Asp Ser Glu Ser Ile Pro Gly Lys Arg Thr Ala Val  
 530 535 540  
 Trp Glu Leu Asp Lys Ser Gly Tyr  
 545 550

<210> 16  
 <211> 387  
 <212> PRT  
 <213> *Arabidopsis thaliana*

<400> 16

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 Asn Gln Leu Glu Val Arg Leu Asp Arg Glu Tyr Lys Pro Ser Ser Val  
 20 25 30  
 Trp Cys Ser Ser Trp Leu Tyr Pro Ile His Lys Lys Ser Gly Gly Trp  
 35 40 45  
 Phe Arg Leu Trp Phe Asp Ala Ala Val Leu Leu Ser Pro Phe Thr Arg  
 50 55 60  
 Cys Phe Ser Asp Arg Met Met Leu Tyr Tyr Asp Pro Asp Leu Asp Asp  
 65 70 75 80  
 Tyr Gln Asn Ala Pro Gly Val Gln Thr Arg Val Pro His Phe Gly Ser  
 85 90 95  
 Thr Lys Ser Leu Leu Tyr Leu Asp Pro Arg Leu Arg Asp Ala Thr Ser

100						105						110					
Tyr	Met	Glu	His	Leu	Val	Lys	Ala	Leu	Glu	Lys	Lys	Cys	Gly	Tyr	Val		
		115					120					125					
Asn	Asp	Gln	Thr	Ile	Leu	Gly	Ala	Pro	Tyr	Asp	Phe	Arg	Tyr	Gly	Leu		
	130					135					140						
Ala	Ala	Ser	Gly	His	Pro	Ser	Arg	Val	Ala	Ser	Gln	Phe	Leu	Gln	Asp		
145					150					155					160		
Leu	Lys	Gln	Leu	Val	Glu	Lys	Thr	Ser	Ser	Glu	Asn	Glu	Gly	Lys	Pro		
				165					170					175			
Val	Ile	Leu	Leu	Ser	His	Ser	Leu	Gly	Gly	Leu	Phe	Val	Leu	His	Phe		
		180						185					190				
Leu	Asn	Arg	Thr	Thr	Pro	Ser	Trp	Arg	Arg	Lys	Tyr	Ile	Lys	His	Phe		
		195					200					205					
Val	Ala	Leu	Ala	Ala	Pro	Trp	Gly	Gly	Thr	Ile	Ser	Gln	Met	Lys	Thr		
	210						215				220						
Phe	Ala	Ser	Gly	Asn	Thr	Leu	Gly	Val	Pro	Leu	Val	Asn	Pro	Leu	Leu		
225					230					235					240		
Val	Arg	Arg	His	Gln	Arg	Thr	Ser	Glu	Ser	Asn	Gln	Trp	Leu	Leu	Pro		
				245					250					255			
Ser	Thr	Lys	Val	Phe	His	Asp	Arg	Thr	Lys	Pro	Leu	Val	Val	Thr	Pro		
			260					265					270				
Gln	Val	Asn	Tyr	Thr	Ala	Tyr	Glu	Met	Asp	Arg	Phe	Phe	Ala	Asp	Ile		
		275					280					285					
Gly	Phe	Ser	Gln	Gly	Val	Val	Pro	Tyr	Lys	Thr	Arg	Val	Leu	Pro	Leu		
	290						295				300						
Thr	Glu	Glu	Leu	Met	Thr	Pro	Gly	Val	Pro	Val	Thr	Cys	Ile	Tyr	Gly		
305					310					315					320		
Arg	Gly	Val	Asp	Thr	Pro	Glu	Val	Leu	Met	Tyr	Gly	Lys	Gly	Gly	Phe		
				325					330					335			
Asp	Lys	Gln	Pro	Glu	Ile	Lys	Tyr	Gly	Asp	Gly	Asp	Gly	Thr	Val	Asn		
			340					345					350				
Leu	Ala	Ser	Leu	Ala	Ala	Leu	Lys	Val	Asp	Ser	Leu	Asn	Thr	Val	Glu		
			355				360					365					
Ile	Asp	Gly	Val	Ser	His	Thr	Ser	Ile	Leu	Lys	Asp	Glu	Ile	Ala	Leu		
	370					375					380						
Lys	Glu	Ile															
385																	

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&lt;211&gt; 389

<212> PRT

<213> Arabidopsis thaliana

<400> 17

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Gly Ile Val Thr Gly Gly Leu Glu Leu Trp Glu Gly Lys Gln Cys Ala  
20 25 30

Asp Gly Leu Phe Arg Lys Arg Leu Trp Gly Gly Thr Phe Leu Cys Trp  
35 40 45

Val Glu His Met Ser Leu Asp Asn Glu Thr Gly Leu Asp Pro Ala Gly  
50 55 60

Ile Arg Val Arg Ala Val Ser Gly Leu Val Ala Ala Asp Tyr Phe Ala  
65 70 75 80

Pro Gly Tyr Phe Val Trp Ala Val Leu Ile Ala Asn Leu Ala His Ile  
85 90 95

Gly Tyr Glu Glu Lys Asn Met Tyr Met Ala Ala Tyr Asp Trp Arg Leu  
100 105 110

Ser Phe Gln Asn Thr Glu Arg Asp Gln Thr Leu Ser Arg Met Lys Ser  
115 120 125

Asn Ile Glu Leu Met Val Ser Thr Asn Gly Gly Lys Lys Ala Val Ile  
130 135 140

Val	Pro	His	Ser	Met	Gly	Val	Leu	Tyr	Phe	Leu	His	Phe	Met	Lys	Trp
145					150					155					160

Val Glu Ala Pro Ala Pro Leu Gly Gly Gly Gly Gly Pro Asp Trp Cys  
165 170 175

Ala Lys Tyr Ile Lys Ala Val Met Asn Ile Gly Gly Pro Phe Leu Gly  
180 185 190

Val Pro Lys Ala Val Ala Gly Leu Phe Ser Ala Glu Ala Lys Asp Met  
195 200 205

Arg Met Thr Arg Thr Trp Asp Ser Thr Met Ser Met Leu Pro Lys Gly  
210 215 220

Gly Asp Thr Ile Trp Gly Gly Leu Asp Trp Ser Pro Glu Leu Pro Asn  
225 230 235 240

Ala Pro Glu Met Glu Ile Tyr Ser Leu Tyr Gly Val Gly Ile Pro Thr  
245 250 255

Glu Arg Ala Tyr Val Tyr Lys Leu Asn Gln Ser Pro Asp Ser Cys Ile  
260 265 270

Pro Phe Gln Ile Phe Thr Ser Ala His Glu Glu Asp Glu Asp Ser Cys  
275 280 285

Leu Lys Ala Gly Val Tyr Asn Val Asp Gly Asp Glu Thr Val Pro Val  
 290 295 300

Leu Ser Ala Gly Tyr Met Cys Ala Lys Ala Trp Arg Gly Lys Thr Arg  
 305 310 315 320

Phe Asn Pro Ser Gly Ile Lys Thr Tyr Ile Arg Glu Tyr Asn His Ser  
 325 330 335

Pro Pro Ala Asn Leu Leu Glu Gly Arg Gly Thr Gln Ser Gly Ala His  
 340 345 350

Val Asp Ile Met Gly Asn Phe Ala Leu Ile Glu Asp Ile Met Arg Val  
 355 360 365

Ala Ala Gly Gly Asn Gly Ser Asp Ile Gly His Asp Gln Val His Ser  
 370 375 380

Gly Ile Phe Glu Trp  
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<210> 18

<211> 402

<212> DNA

<213> Arabidopsis thaliana

<220>

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<222> (120)..(401)

<221> Unsure

<222> 1..401

<223> n is c, g, a, t or u.

<221> Unsure

<222> 1..401

<223> Xaa = unknown

<400> 18

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ctggacgaga ttgacaaag tccgtatagc ttaacctggt ttaatttcaa gtgacagat 119

atg ccc ctt att cat cgg aaa aag ccg acg gag aaa cca tcg acg ccg 167  
 Met Pro Leu Ile His Arg Lys Lys Pro Thr Glu Lys Pro Ser Thr Pro  
 1 5 10 15

cca tct gaa gag gtg gtg cac gat gag gat tcg caa aag aaa cca cac 215  
 Pro Ser Glu Glu Val Val His Asp Glu Asp Ser Gln Lys Lys Pro His  
 20 25 30

gaa tct tcc aaa tcc cac cat aag naa tcg aac gga gga ggg aag tgg 263  
 Glu Ser Ser Lys Ser His His Lys Xaa Ser Asn Gly Gly Gly Lys Trp  
 35 40 45

tcg tgc atc gat tct tgt tgt tgg ttc att ggg tgt gtg tgt gta acc 311  
 Ser Cys Ile Asp Ser Cys Cys Trp Phe Ile Gly Cys Val Cys Val Thr  
 50 55 60



tgg tgg ttt ctt ctc ttc ctt tac aac gca atg cct gcg agc ttc cct 359  
 Trp Trp Phe Leu Leu Phe Leu Tyr Asn Ala Met Pro Ala Ser Phe Pro  
 65 70 75 80

cag tat gta acg gag ccg aat cac gng tcc ttt gcc tta ccc g 402  
 Gln Tyr Val Thr Glu Pro Asn His Xaa Ser Phe Ala Leu Pro  
 85 90

<210> 19  
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 <212> DNA  
 <213> Neurospora crassa

<220>  
 <221> Unsure  
 <222> 1..516  
 <223> n is g, c, a, t, or u.

<400> 19

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 accctctaga gacacgacta ccnttgcacc cagcctcaag gtntacngtt tntatgggta 120  
 ggaagccgac ggagcgagcc tacatctatc tggcgcccga tcccgggacg acaacgcac 180  
 tttagatgac gatcgatacg actttgactn agggggcacat tgaccacggt gtgattttgg 240  
 gcgaaggcga tggcacagtg aaccttatga gtttggggta cctgtgcaat aaggggtgga 300  
 aaatgaagag atacaatcct gcggggtcaa aaataaccgt ggtcgagatg ccgcatgaac 360  
 cagaacggtt caatccgaga ggagggccga atacggcgga cttaaataatg tagaaaagg 420  
 tgaaatttat gaagagtaat taaatacggc acatagggtta ctcaatagta tgactaatta 480  
 aaaaaaaatt ttttttctaa aaaaaaaaaa aaaaaa 516

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